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The American FERTILIZER

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THE strategic factory locations of The American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Bone Ash, Bone Oil, Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Ammonium Carbonate, Ammonium Fluosilicate, Magnesium Fluosilicate, Potassium Fluosilicate, Phosphorus Pentasulphide, Phosphorus Sesquisulphide (lump), Zinc Fluosilicate, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish and Blood. We mine and sell all grades of Florida Pebble Phosphate Rock.

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Buffalo, N. Y.	Fulton, Ill.	Pierce, Fla.
Carteret, N. J.	Greensboro, N. C.	Port Hope, Ont., Can.
Cayce, S. C.	Havana, Cuba	Savannah, Ga.
Chambly Canton, Quebec, Can.	Henderson, N. C.	Searsport, Maine
	Montgomery, Ala.	South Amboy, N. J.
Charleston, S. C.	Nat. Stockyards, Ill.	Spartanburg, S. C.
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The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York 7, N. Y.

SALES OFFICES

Alexandria, Va.	Clinton, Iowa	Laurel, Miss.	Pensacola, Fla.
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Buffalo, N. Y.	Detroit, Mich.	Montreal, Quebec, Can.	Port Hope, Ont., Can.
Carteret, N. J.	Greensboro, N. C.	National Stockyards, Ill.	Savannah, Ga.
Charleston, S. C.	Havana, Cuba	New York, N. Y.	Spartanburg, S. C.
Cincinnati, Ohio	Henderson, N. C.	Norfolk, Va.	Wilmington, N. C.
Cleveland, Ohio	Houlton, Me.	No. Weymouth, Mass.	

The American FERTILIZER

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American Plant Food Council Convention

Fourth Annual Meeting to Be Held at Bretton Woods, N. H., June 19th to 22nd. Well-Rounded Program Arranged. Chairman Cooley, of House Agricultural Commitee, to Address Annual Dinner

The fertilizer industry will meet in a new setting when the fourth annual convention of the American Plant Food Council opens at the Mount Washington Hotel, Bretton Woods, New Hampshire, on June 19th. The entire facilities of the hotel, which is located on a 10,000 acre estate in the beautiful Presidential Range, will be available to the members and their guests during the entire convention period which extends from June 19th to 22nd inclusive. Included in these facilities is an 18-hole championship golf course, an outdoor swimming pool, tennis courts and other features.

The Convention Committee, which includes J. A. Howell, (Virginia-Carolina Chemical Corp.), *chairman*, C. B. Robertson (Robertson Chemical Corporation), Fred J. Woods (Gulf Fertilizer Co.), have prepared a program which will include well-known soil scientists, members of Congress, Government agricultural leaders, educators, national 4-H Club leaders, agricultural editors.

Two general sessions will be held on the mornings of Monday, June 20th and Tuesday, June 21st. The feature of the Monday meeting will be an Agricultural Panel in which a notable list of experts will discuss "Fertilizer, Farming and the Future." The highlights of the Tuesday session will be talks by Dr. William I. Myers, of Cornell University and by Miss Rita Bott and Mr. Francis Pressly, National 4-H Club Leaders.

The afternoons have been left free for golf and other recreational activities. The annual dinner of the Council will be held Tuesday evening, at which Representative Harold D. Cooley, of North Carolina, Chairman of the House Committee on Agriculture will be the principal speaker.

PROGRAM OF MEETINGS

Sunday, June 19th

Registration
Recreation
8:00 P. M., Meeting, Board of Directors

Monday, June 20th

10:00 A. M.
Opening of Convention
Address by President
Introduction of Prominent Guests
Appointment of Committees
Announcements

10:30 A. M.

AGRICULTURAL PANEL

Subject: "*Fertilizer, Farming and the Future.*"

Dr. Paul D. Sanders, Editor "The Southern Planter," Moderator

Dr. Robert F. Chandler, Jr., Director, Agricultural Experiment Station; Dean, College of Agriculture at the University of New Hampshire, Durham

Dr. Ralph W. Cummings, Associate Director, N. C. Experiment Station, State College, Raleigh

Representative Charles B. Hoeven (R-Iowa), Member of House Committee on Agriculture

Dr. W. H. Pierre, Head of Agronomy Department, Iowa State College, Ames

Dr. Robert M. Salter, Chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture

Afternoon
Golf for men and appropriate events for the ladies.

10:00 P. M.
Dancing

Tuesday, June 21st

10:00 A. M., Opening
Address—Dr. William I. Myers, Dean of Agriculture, State College of Agriculture, Cornell University
Talks—Miss Rita Bott, National 4-H Club Leader, Triadelphia, W. Va.
Francis Pressly, National 4-H Club Leader, Stony Point, N. C.

11:15 A. M.
Business Session
Reports of Committees
Election of Members of Board, etc.

Afternoon
Recreation

6:30 P. M.
Cocktail Party

7:30 P. M.
Annual Dinner
Entertainment
Speaker—Representative Harold D. Cooley (D- N. C.), Chairman House Committee on Agriculture

10:00 P. M.
Dancing

Wednesday, June 22nd

10:00 A. M.
Meeting of the new Board
Adoption of the Budget
Appointment of Executive Committee
Organization Meeting of Executive Committee
Other Business
Adjourn, sine die

Afternoon
Recreation

Election of Directors

The convention will elect eight directors for a term of three years. The nominating committee is composed of J. V. Collis, *chairman*, George Cushman and F. J. Woods. Those whose terms expire and who, by the provisions of the by-laws, are not eligible to re-election, are Albert B. Baker, J. V. Collis, George Cushman, Howard C. Fisher, Fred W. Heidinger, James S. Rossman, F. J. Woods, M. S. Wright.

Golf

The annual golf tournament is under the supervision of an able committee headed by Albert B. Baker, Jr., *chairman*. Other members are Albert B. Baker, Sr., Charles F. Burroughs, Jr., Dean Gidney, John Ground, III, W. F. McLane. A series of competitions have been arranged which will give adequate opportunity for every class of player, from the scratch golfer to the duffer, to win one of the many attractive prizes which have been donated for this occasion.

Convention Committees

The Hospitality Committee, which plays such an important part in the success of the convention, is composed of Tracy Cunningham, *chairman*, Malcolm E. Hunter, F. B. Stephenson, J. D. Stewart, Jr., G. A. Woods.

An enjoyable program of events for the ladies will be in charge of a committee consisting of Mrs. A. B. Baker, Sr., *chairman*, Mrs. Horace M. Albright, Mrs. George E. Petitt, Mrs. J. D. Stewart, Jr., Mrs. Harry B. Caldwell.

The Credentials Committee is composed of Irvin Morgan, *chairman*, W. L. Nichols, A. F. Pringle, Jr.

The memorial to those members who have died during the past year will be prepared by a committee which includes W. Dewey Cooke, *chairman*, W. E. Barret, Enos Valliant.

Transportation

In addition to the regular train service from New York and other points, the Council has arranged for a special convention train. This will leave New York on Saturday evening, June 18th at about 9:30. The return trip will leave Bretton Woods on Wednesday, June 22nd at about 8:30 P. M.

Pacific Guano Appointments

On June 1st, Dr. Wallace Macfarlane assumed his new duties as vice-president of the Pacific Guano Company, according to an announcement by Weller Noble, president. Dr. Macfarlane will be in charge of development and expansion.

On the same date, Howard G. Conley became manager of the Southern Division of the company.

Fertilizer Placement in England*

By G. W. COOKE, B.Sc., Ph.D., A.R.I.C.

Chemistry Department, Rothamsted Experimental Station, Harpenden, Herts, England.

In an early speech, Sir John Lawes stated that one of the aims of agricultural science was to tell the farmers how to put the right manure in the right place. As a result of field experiments which have continued since Lawes started work on fertilizers at Rothamsted, we are slowly learning what are right fertilizers for different crops; this afternoon I shall give you an account of recent work planned to find the right place for the fertilizer

There are three main stages in the cultivation of arable land where fertilizer may be applied up to the time of sowing. If spread before the land is ploughed, ploughing and subsequent cultivations will incorporate the fertilizer to the full depth of the cultivated layer of soil. Alternatively it may be broadcast at some stage after ploughing and before the seedbed is prepared; the depth to which the fertilizer penetrates will then depend on the intensity of the cultivations given in preparing the seedbed. Again it may be applied by special machines and localised in bands in some definite position in the soil. Fertilizer placement is the name given to this last method. The fertilizer is put in definite bands or pockets near to the seed, the object being to make better use of the material than is possible by mixing it with the surface soil.

Placement is by no means a recent innovation, and when Lawes first made superphosphate at Rothamsted, a little over a hundred years ago, he drilled it with the seed of turnips. Later last century, it was generally believed that fertilizers should be thoroughly mixed with the soil by cultivators and harrows. A few farmers continued to mix their fertilizer and seed and sow in an ordinary drill, as Lawes had done. Again, in parts of the Fens, a type of drill with separate hoppers for seed and fertilizer has remained popular. These implements deposit a broad band of fertilizer, usually superphosphate, a little below the seed. In America, broadcast distributors have never been very popular; combined seed and fertilizer drills were introduced as early as 1854. For some crops it was found best to separate the fertilizer and seed by an inch or two of soil and American manufacturers have developed machines which place a band of fertilizer a little below the seed and an inch or two away to the side.

In England, combined seed and fertilizer drills were used in only a few districts before the war. Considerable numbers of grain drills fitted with fertilizer hoppers were imported from 1940 onwards. These were very successful, particularly for reclaiming phosphate-deficient land ploughed from old grass where a small amount of superphosphate drilled with the seed secured a good crop and the same quantity broadcast was often of little use. The success of these drills for grain has induced many farmers to try the method for other crops. Many found that germination was damaged when mixtures containing much nitrogen or potash were sowed with the seed of root crops. Recent experiments have been planned to find where the fertilizer can be placed so as to avoid injury and secure maximum efficiency.

Advantages of Placement

There are a number of good reasons why fertilizer placed near the seed should act more efficiently than the same quantity mixed with the bulk of the soil in the cultivated layer.

An adequate amount of fertilizer close to the roots of a young seedling helps it to start growing quickly. Such an early start is most important in making the crop grow away from injury by pests or diseases and in helping it to compete with weeds or to withstand an early drought. Again if wheat has to be drilled late in the autumn on a poor seedbed, superphosphate or an NP compound with a low N, combine-drilled, often gives a satisfactory plant where the same fertilizer broadcast would give a poor crop.

Fertilizer placed near the seed often causes early maturity which is important in bad seasons.

Placement can be important in making the maximum proportion of the fertilizer applied serve a useful purpose in growing crops. Inefficient use of fertilizers may be caused by losses in the soil. Nitrogen fertilizers are ultimately leached out of the soil by rainfall,

* From an address before the General Meeting of the Fertilizer Society, Harpenden, England, June 2, 1949.

whether broadcast or placed in bands. Phosphate and potash fertilizers are not leached out, but over a period of time, they react with certain soil constituents to form complex compounds which are useless as plant food. This process of fixation should be reduced when fertilizer is put in narrow bands because there is much less soil in contact with the fertilizer.

The efficiency of placement will depend on the root system of the crop and on the rate of nutrient uptake. Placed fertilizer will be advantageous for crops having a shallow and restricted root system and for crops requiring high nutrient uptake in the early stages of growth.

In a dry period, the surface soil dries out and fertilizer in that zone is useless because plant roots can only take up nutrients from moist soil. For this reason, workers in America have placed fertilizer deeply in the soil by dropping it on the bottom of the furrow when ploughing.

In America placement has been developed so successfully because many important crops such as maize, cotton, tobacco and potatoes are grown on very wide rows with spacings of 36 to 48 inches. With such row widths fertilizer broadcast and lying mid-way between the rows will not be reached by the roots of the crop until late in the season and may be largely wasted.

Review of Recent Experimental Work on Fertilizer Placement in England

Cereals

A large number of combined seed and fertilizer cereal drills were imported in the early years of the war. Experiments were carried out in 1943 and subsequent years to give some quantitative evidence of the value of these drills. Although there are several makes the mechanism is rather similar. The implements have two hoppers, one for seed and the other for fertilizer. Fertilizer and seed are deposited in the soil in contact by single coulters usually spaced seven inches apart. Ordinary drills which were in general use on farms were used in the experiments.

Generally two rates of superphosphate, 1.5 and 3 cwts. per acre were tested, both drilled with the seed and broadcast. The crops were wheat, oats and barley and they behaved in much the same way. In practically all the experiments where superphosphate had any effect, the results from combine-drilling were better than from broadcasting the fertilizer. In a few of the experiments, on soils where phosphate was very deficient, the results were spectacular, the yields given by superphosphate drilled with the seed being normal while with the same amount of superphosphate broadcast, the crop was almost a failure. The experiments also showed that combine-drilled phosphate gave much more vigorous early growth and earlier maturity than broadcast phosphate. The data given in Table 1 have been taken from the published account of these experiments (E. M. Crowther. Agriculture *52*, page 170 [1945]).

TABLE 1.
COMPARISON OF BROADCAST AND COMBINE-DRILLED SUPERPHOSPHATE FOR CEREALS

YIELDS AS PERCENTAGE OF MEAN FOR EXPERIMENT

Experiments	No Phosphate	Super Broadcast 1.5 cwt.	Super Broadcast 3 cwt.	Super Combine-drilled 1.5 cwt.	Super Combine-drilled 3 cwt.
1943 (8)....	73	94	105	105	123
1944 (38)....	71	93	106	109	121

The average yield from 1.5 cwt. of superphosphate per acre drilled with the seed was very similar to that from 3 cwt. broadcast and the yields from 3 cwts. per acre combine-drilled were much greater than those from 3 cwts. broadcast. The experiments showed that superphosphate is twice as effective combine-drilled as broadcast. Similar experiments were carried out in Scotland and have confirmed the results.

Other experiments on barley have tested potash fertilizer for cereals on light chalky soils in Southern England. On such soils, 0.5 cwt. per acre of muriate of potash, combine-drilled has consistently produced as high yields as 1.0 cwt. broadcast. On other soils less deficient in potash, broadcasting the fertilizer has proved as efficient as combine-drilling. Heavy dressings of potassium and nitrogen fertilizers have damaged the germination of cereals and, in general, a dressing of mixed fertilizer to be drilled with the seed should not exceed 3 cwts. per acre and proportionally less when concentrated fertilizers are used.

Row Crops

Many farmers, impressed by the results of drilling phosphate with the seed of cereals, have attempted to modify their combine-drills to sow fertilizer with the seed of row crops such as sugar beet, swedes and peas. Such attempts have frequently resulted in serious reduction in germination and loss of plant. For all crops other than cereals, it is

better to broadcast fertilizer mixtures rather than use a combine drill which places them in contact with the seed. Small applications drilled with the seed may occasionally be successful but the risk of damage to plant establishment is too serious for the practice to be generally recommended.

Special Machinery

When we began work on crops such as potatoes and sugar beet grown on wider rows, we found that there were no suitable machines for experiments. For successful experiments on fertilizer placement, it is essential that the amount of fertilizer applied to a particular plot should be known exactly, and that any machine used for applying fertilizer should be put on the same amount on different days with the same setting of the gears. All commercial drills are subject to very serious day-to-day variations in delivery rate depending on the type of fertilizer used (that is, whether it is a powder or in granules), the constituents of the fertilizer, the conditions under which it has been stored and the atmospheric humidity on the day of drilling.

TABLE 2.
CALIBRATION OF FERTILIZER PLACEMENT DRILL

DRILL SETTING	Cwts. of Fertilizer Per Acre DELIVERY RATE	
	Left Hand Coulter	Right Hand Coulter
2	5.5	1.7
4	5.8	6.3
6	5.5	4.1
12	3.9	3.7

Table 2 gives some values obtained in calibrating a drill which are an extreme illustration of these difficulties. This was a commercial implement designed to sow the seed of root crops and place the fertilizer below the seed; the delivery rate of the drill was tested using the various settings provided by the insert table— — —(2) — — — manufacturer. This drill was quite useless for experimental work as the settings for different rates were valueless and there was no relation between the rates delivered by the two coulters for any one setting.

To overcome these difficulties, the National Institute of Agricultural Engineering constructed two machines, one for experiments on potatoes and the other for row crops, such as peas and sugar beet. A positive displacement delivery system was incorporated which has been developed in America for experimental work. A drum contains a column of fertilizer supported by a piston and the machine is arranged so that a drive from the land wheels goes through a gear box (giving various delivery rates) and turns the drum round. The piston is keyed to the drum and mounted on a stationary screw; as the drum and piston turn round on the screw, the piston rises and forces a column of fertilizer upwards. The fertilizer flows over the top of the drum and is dispensed to two delivery spouts.

With such a machine, a definite volume of fertilizer must be delivered for a unit distance travelled, assuming that the driving wheel does not slip. Wheel slip was estimated by running the machine over a measured distance and using a revolution counter to show the number of times the wheel had turned round. The amount of slip was not high and averaged 7.8 per cent in one particular season's work on potatoes. At each centre the delivery system of the machine was calibrated by weighing the fertilizer delivered into collecting boxes while travelling over a measured distance. In spite of this improved delivery system, there was considerable variation in delivery rates from day to day using powder fertilizers. These variations could only be due to changes in the density of the fertilizer.

The delivery system of the machine was investigated, and considerable changes in the density of the fertilizer in the cylinder did occur during the time the machine was being used. These changes were due to consolidation caused partly by upward pressure of the piston and partly by vibration from the tractor and jolting over rough ground. Both effects were demonstrated in laboratory experiments which showed that granular fertilizers gave much smaller variations in apparent density than powders.

The effect of the alterations in density were minimised by rejecting the fertilizer delivered by the first 20 revolutions of the cylinder and also by running the machine over non-experimental land to give an initial consolidation of the fertilizer. After three years' experience with powdered fertilizers in potato experiments, we concluded that the poor condition of these materials seriously limited their value for placement and that only granular fertilizers had sufficiently constant physical properties to be suitable for accurate placement experiments.

Special machines used for experimental work must satisfy several other conditions. They must allow satisfactory experimental designs to be used in laying-out the plots. The work on each experiment must be completed in a reasonable time and must also fit in well

(Continued on page 22)

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Principal Articles in This Issue

Lion Oil Increasing Nitrogen Production Facilities

Lion Oil Company has reported that the expansion program for their Chemical Division, inaugurated in 1948, is now nearing completion.

The largest of the four projects centered at the El Dorado, Ark., chemical plant provides for enlargement of the facilities for the production of anhydrous ammonia which will increase capacity to 570 tons per day, an increase of more than 30 per cent. This job, which will be finished about mid-year, includes extension of the gas engine compressor units, enlargement of purification facilities, the addition of another high pressure ammonia converter unit, together with required circulatory system and refrigeration, and expansion of the synthesis building. Two new 1300-ton spheres are also being added for pressure storage of ammonia. Total cost of this project is estimated at $3,500,000.

A sulphuric acid plant and a sulphate of ammonia plant are under construction and are scheduled to be in operation by the fall of 1949.

The sulphuric acid plant will burn 100 tons of sulphur per day to produce 300 tons daily of sulphuric acid. Except for small quantities used in other manufacturing operations this acid will be neutralized with 100 tons per day of ammonia to produce 380 tons per day of commercial grade ammonium sulphate. Ammonium sulphate will then be added to the list of fertilizers produced and sold by Lion; this type of fertilizer is in great demand. Bulk storage is being provided for 4,000 tons of crystal sulphate of ammonia. Combined cost of the two plants will be about $2,000,000.

In addition, the ammonium nitrate prilling plant is undergoing extensive revision and remodeling designed to increase capacity and further improve the quality of the product. These alterations, which will cost some $800,000, will be completed by the third quarter of 1949.

Other improvements were effected at the chemical plant in addition to the larger items of the expansion program. Substantial capital additions to the nitrogen solutions plant were made to increase capacity and improve product specification control. Included in this project was the erection of a battery of aluminum storage and blending tanks for greater facility of operation. The fleet of tank cars in nitrogen fertilizer solution service has been increased by the addition of

sixteen specially designed aluminum tank cars. Forty more of these cars are on order for delivery during the third quarter of 1949. To insure longer life of equipment, corrosion-resistant aluminum is being used in the manufacture, storage and shipment of nitrogen solutions.

Internals of a new and improved design are being installed in the ammonia synthesis converters. Super-heaters were installed on the four main boilers at the steam plant to provide superheated steam to the steam-turbo generators and increase general steam efficiency.

Roads, railroads, and utility lines are being expanded or rearranged as required by the increasing volume of operations.

American Plant Food Council Entertains Farm Publicity Men

At the recent meetings of the American Agricultural Editors' Association and the Association of Radio Farm Editors held in Washington, the assembled publicity experts were entertained at luncheons by the officers of the American Plant Food Council. President Clifton A. Woodrum, addressing the Radio Directors, told them that while the fertilizer supply situation "has been tight, particularly with some materials" that "remarkable progress is being made, production has been more than doubled and is still increasing." He said the industry is looking to the future with confidence—confidence not only in its ability to meet all the needs of the farmers but confidence that agriculture will continue to have a measure of prosperity.

Army to Sell Ohio River Ammonia Plant

The Army has called for bids on the purchase of its Ohio River Ordnance Plant at West Henderson, Ky.

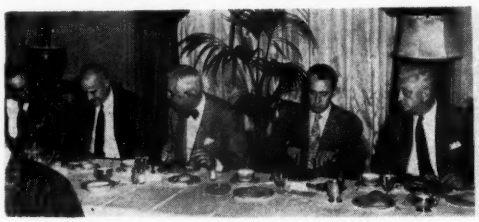
The plant has been producing about 65,000 tons of anhydrous ammonia a year for use in the Army's overseas fertilizer program. The production is no longer needed for the Army's purely military commitments and it is the purpose to turn the plant over to private interests so that its capacity may be made available for the domestic economy.

The plant will be disposed of by the Army under the terms of the national security clause, which provides that it shall be turned back to the government in an emergency when required by the Secretary of the Army.

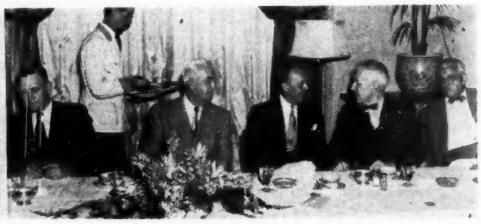
Brochures describing the plant in detail along with invitations to bid will be sent out to prospective purchasers about July 1 and sixty days will be allowed bidders to make their offers. Sale of the plant will be handled by the Louisville district. Inquiries should be addressed to the district engineers, Louisville district, 830 West Broadway, Louisville 1, Ky.

European Superphosphate Producers Hold Annual Meeting

The recent annual meeting of the International Superphosphate Manufacturers Association, held at Copenhagen, Denmark, was attended by about two hundred delegates and guests, representing manufacturers and sup-



A. P. F. C. LUNCHEON FOR RADIO DIRECTORS
Left to right: Phil Alampi, (WJZ, New York), Secretary-Treasurer of the Association; Wallace Kadderly, (KGW, Portland, Ore.), President of the Association; Clifton A. Woodrum, President of the Council; Keith Himebaugh, Chief, Office of Information, U. S. Department of Agriculture and W. T. Wright, Vice-President, F. S. Royster Guano Company, Norfolk, Va., representing the Council's Executive Committee.



NOTABLES AT FARM EDITORS' LUNCHEON
Left to right, are: Under Secretary of Agriculture Albert J. Loveland; Council President Clifton A. Woodrum; House Agricultural Committee Chairman Harold D. Cooley of North Carolina; Senator George D. Aiken of Vermont, ranking minority member of the Senate Agriculture Committee and W. T. Wright, Vice-President, F. S. Royster Guano Co., Norfolk, Va., representing the Council's Executive Committee.

pliers throughout the world. The delegates were entertained by the Danish superphosphate producers.

Officers for 1949–50 were elected as follows: *president*, R. Standaert (Belgium); *Vice-presidents*, R. Audonin (France), B. Colbjörnsen (Sweden), F. G. Clavering Fison (United Kingdom), H. Stevenius-Nielsen (Denmark), J. D. Waller (Netherlands); *Secretary*, R. M. Collins.

The retiring president, A. Waller (Netherlands) who, because of his withdrawal from active business, was not a candidate for re-election, was unanimously elected Honorary President of the Association in recognition of his valuable service to the organization and to the industry.

A series of technical meetings has been arranged in Milan during the month of October, 1949, and the Spanish members have invited the Association to hold its next annual meeting in Spain.

The Association's general offices are now at 32, Old Queen Street, London S. W. 1., England, and the offices of the Agricultural Committee at 139, Bd. Haussmann, Paris (8e), France.

Finn Succeeds Roberts as Bemis Peoria Manager

Ernest B. Roberts has announced his retirement as manager of the Bemis Bro. Bag Co. paper mill and multiwall bag factory at Peoria, effective July 1. He plans to continue with the company in charge of pulp and rope purchasing with headquarters at Peoria. L. J. Finn, now assistant manager at Peoria, has been appointed to succeed Mr. Roberts as manager.

Mr. Roberts joined Bemis in 1911 and immediately began a survey for the location of a paper mill. He chose Peoria as the site, was in charge of construction and acquiring equipment, and when the building was completed in 1913, he was made mill manager. He is a member of the Technical Association of Pulp and Paper Industry.

Mr. Finn started with Bemis in the Engineering Department at St. Louis in 1914, later entering sales work and for several years traveling in Mexico. In 1925 he was transferred to the Peoria multiwall paper bag plant as sales manager, and was appointed assistant manager in 1935.

North Dakota Starts Fertilizer Tests

Nineteen farmers in five North Dakota counties are starting out this season on a long time test demonstration program to gain additional information on the value and effects of phosphate fertilizer, announces R. B. Widdifield, NDAC Extension.

Cooperating in the test demonstration farm program with the North Dakota Extension Service, are the North Dakota Agriculture Experiment Station, the U. S. Soil Conservation Service, and the Tennessee Valley Authority and local farmers. Widdifield is heading the program.

To secure distribution across the state, as well as to include various farming and soil types, the five counties selected for these demonstrations are Walsh, Richland, Stutsman, McKenzie and Hettinger. County extension agents, working with local soil conservation district supervisors and technicians, have selected three or four local farmers in each county to try out phosphate fertilizer on their entire farms over a period of years. Farms selected vary in size from 92-acre irrigated farm in McKenzie county up to farms containing 3,000 acres in Stutsman and McKenzie counties. Grain farms, grain and livestock, dry land and irrigated types are all included.

FERTILIZER MATERIALS MARKET

NEW YORK

Exclusive Correspondence to "The American Fertilizer"

Little Change in Prices on Contract Chemical Materials Expected for Next Season. Better Supplies of Nitrogen and Potash Expected. Inquiries for Export Nitrogen Materials Reported. Supply of Castor Pomace Expected to Drop. Other Organics in Good Demand.

NEW YORK, June 8, 1949.

Sulphate of Ammonia

While new contracts have not been placed in the hands of the buyers, little change in price is looked for as the demand in some places has caught up with the supply and at this season of the year fertilizer manufacturers are not too anxious to store this material unless they actually need it. Some export inquiry was noted but little business actually placed.

Nitrate of Soda

It was reported that the domestic material was in better supply than the imported material. Some manufacturers recently turned down offers from the producers as they felt they had enough material on hand.

Ammonium Nitrate

There were several large export inquiries in the market but no actual business reported placed. Domestic production was good at most plants and buyers were not having the same difficulty they had last year in filling their requirements although in some sections the material was still scarce.

Castor Pomace

With present market quoted at $21.00 per ton, f.o.b. production points, it was difficult to secure any offerings as producers have cut their production to a point where they are making very little castor pomace and unless this situation changes there will not be very much of this material for sale this season. At the present time no offerings are available.

Organics

Tankage and blood were in better demand from both fertilizer and feed buyers and sales were made on a steady basis of $8.00 per unit of ammonia ($9.72 per unit N), f.o.b. eastern shipping points. Supplies were not too heavy and some of the principal producers were sold ahead. Soybean meal was a little easier in price with present market around $56.00 per ton, f.o.b. Decatur, Ill. Cottonseed meal for quick shipment was in a fairly strong position and some export inquiry was noted. Linseed meal was easy in price with last sales at $52.00 per ton in bulk, f.o.b. Minneapolis.

Fish Meal

With the start of the fishing season at hand, some easing in price of this material was looked for. While no direct reports were heard as yet, it is felt in the trade that present high re-sale prices will not exist when the run of fish gets heavier. No further trading was reported on a "when and if made" basis as most of the fish factories preferred to wait to see how the catch turned out.

Bone Meal

This material was still in short supply with feed buyers taking the biggest part of present production. Some imported material has arrived from abroad but this has not helped the situation very much. Raw bone meal was particularly hard to locate.

Hoof Meal

Some activity was noted in this material with sales made at $7.00 and $7.25 per unit of ammonia ($8.51 to $8.82 per unit N), f.o.b. shipping points. Offerings were scarce.

Superphosphate

While new prices have not been announced for the coming season, little change is looked for as production costs, freight and other charges remain high. The supply in most sections is adequate to take care of buyers' needs.

Potash

With all the producers quoting about the same basic prices as last year and contracts

having been sent out for the new season, it is felt the supply picture is not only better but some buyers will not need as much as they had the previous year. There were still shortages reported for quick shipment in certain areas where the manufacturers experienced a last minute rush for mixed fertilizer.

CHICAGO

Organics Market Firm with Heavier Demand for Some Materials. Few Long Time Commitments Made.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, June 6, 1949

The Midwestern market on animal proteins is still in a very firm position. During the past two weeks the demand for meat scraps has broadened to such an extent that producers are finding it difficult to fill orders. Processors are still reluctant to make long time commitments and the demand for unfinished goods is still largely limited to June shipment, although in some instances product has sold for July.

Meat scraps are listed $125 to $130 per ton, sacked, f.o.b. most shipping points. The demand for digester tankage is not quite as heavy as for meat scraps and the list on this product is $110 to $115 per ton. Dry rendered tankage is strong at $2.30 to $2.35 per unit of protein, delivered nearby shipping points, and in some instances this price is asked f.o.b.

Wet rendered tankage is firm at $8.50 per unit of ammonia ($10.33 per unit N), for high testing material and $9.00 to $9.50 per unit ($10.94 to $11.55 per unit N) for product with a low ammonia content. Blood does not enjoy the same demand as other products and is nominally quoted at $7.00 per unit of ammonia ($8.51 per unit N), delivered. Steamed bone meal, sacked, 65 per cent B.P.L., $65 per ton.

PHILADELPHIA

Spot Potash Only Material in Active Demand. More Domestic Nitrate of Soda on the Market. Labor Costs Increase at Phosphate Mines.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, June 6, 1949.

Except for spot potash there is very little demand for raw materials at this time. Nitrogen for top dressing is moving normally. The organic market has stiffened somewhat, due to better interest shown by the feeding trade, and rather light production.

Sulphate of Ammonia.—Supply position remains fairly tight, with production mostly under contract on the basis of market value at time of delivery.

Nitrate of Soda.—Demand is active for top dressing. Increased production of domestic grade continues, while the imported material finds ready outlet. No price changes are reported.

Blood, Tankage, Bone.—While blood waa quoted as low as $7.00 per unit of ammonis ($8.51 per unit N), per ton in Chicago, the price was $8.00 per unit ($9.72 per unit N) here in the East. Tankage was offered at $7.50 ($9.12 per unit N) in the west, but $8.00 per unit ($9.72 per unit N) in this area here in the East. Bone is quite scarce and production is now not equal to the demand. Hoof meal in limited supply is quoted at $7.00 per unit of ammonia ($8.51 per unit N) in Chicago.

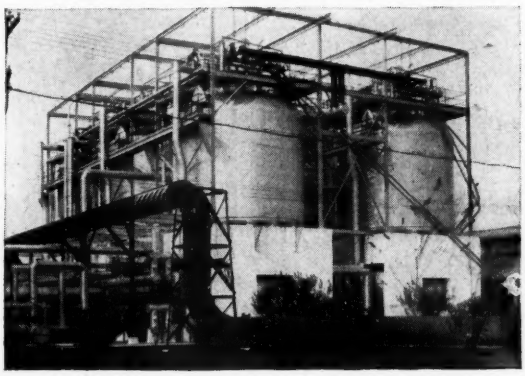
Castor Pomace.—There is good inquiry for this material but production is restricted and movement is entirely against standing contracts, with requirements ahead of supply.

Fish Scrap.—The market remains very unsettled pending opening of the new fishing season. Sixty per cent Menhaden meal has been quoted at $225.00 to $240.00 per ton.

SULPHUR

*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*SUPERHEATED WATER . . .



Mining operations are most successfully carried out if the water pumped into the sulphur deposit is heated under pressure to a temperature of about 320° F. For large scale mining, enormous quantities of water are required, so, a primary requisite is an adequate supply of suitable water and an efficient power plant in which to heat it.

To insure a continuous supply of water at Newgulf, it is the practice to use river water pumped in time of flood or full flow and stored in large reservoirs. This supply is supplemented, when necessary, with well water. Water so obtained is seldom suitable for use in boilers or mine water heaters without being treated first because of natural salts in solution. Softening by chemical treatment is necessary to prevent deposition of scale on boiler tubes and hot water lines.

Loading operations at one of the huge vats of Sulphur at our Newgulf, Texas mine. Such mountains of Sulphur are constantly being built at our mines, from which shipments are continually made.

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INC.

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Mines: Newgulf and Moss Bluff, Texas

Phosphate Rock.—Labor difficulties at the mines have been pretty well ironed out, but it is expected that consequent wage increases will be reflected in higher prices soon. Shipments are said to be behind schedule with some acidulators seriously inconvenienced.

Superphosphate.—Demand is good and market position quite firm. Price remains at 76 to 77 cents per unit A.P.A. per ton, but increase in rock costs may later be felt in superphosphate.

Potash.—Demand for spot is quite pronounced and there is considerable activity in contracts for deliveries spread over the coming fertilizer year. Prices remain practically same as last season except an advance of 1½ cents per unit for specially prepared granular grade of 60 per cent muriate.

CHARLESTON

Many Mixers Contracting for Future Materials. Little Change in Prices. Phosphate Rock Strike Hampers Superphosphate Output.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, June 6, 1949

Fertilizer manufacturers are now in the process of estimating their needs of various materials for the new season and contracts for sulphate of ammonia, organic nitrogen, potash, etc., are being heavily made. Superphosphate in certain areas of the Midwest and southeast is in short supply, due to strikes at the rock mines. Potash demand continues steady and buyers are contracting heavily for the new season.

Organics.—Several popular organics for fertilizer purposes are now sold up through December as quite a number of fertilizer manufacturers have come into the market for their future needs. Nitrogenous tankage is now offered at $3.15 to $4.00 per unit of ammonia ($3.83 to $4.86 per unit N), f.o.b. production point for fall and spring shipment. South American organics continue too high in price to interest domestic buyers.

Castor Pomace.—The three prime producers of castor pomace are at present in a sold-up condition. The market is nominally $21.00 per ton in bags f.o.b. northeastern production points. Movement is against existing contracts.

Dried Ground Blood.—Chicago lists this material at $7.00 per unit of ammonia ($8.51 per unit N) in bulk but offerings are few. The New York market is in the doldrums at around $8.00 per unit of ammonia ($9.72 per unit N) in bulk. Imported material is entirely too high to compare with the domestic market.

Potash.—Another major producer has announced contract prices for the new season, the only change from last season's price being 39 cents per unit for 60 per cent granular muriate, which was previously priced at 37½ cents. Buyers are price-conscious and are placing contracts prior to June 30, in order to secure the largest discount.

Phosphate Rock.—As of this writing, one of the largest producers of phosphate rock is still strike-bound and definite shortages have developed in certain areas among customers of that producer. It is hoped that the strike will be settled in the next week or so. Prices are firm, subject only to recent reductions in the cost of oil at the mines.

Superphosphate.—Some acidulators in the Midwest and also in the southeast have had to curtail operations, and in some instances, stop production of superphosphate as a result of strikes at the phosphate rock mines. Due to lack of rock supplies for over a month, superphosphate in certain areas of the Midwest and southeast is in short supply.

Sulphate of Ammonia.—In the lower southeast there seems to be a plentiful supply of synthetic sulphate of ammonia, ranging in price from $52.00 to $58.75, f.o.b. production

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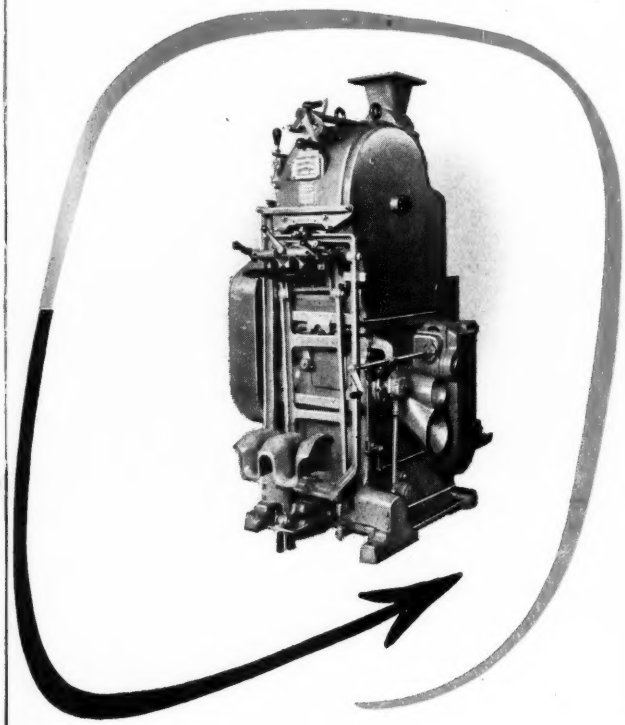

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point, depending on its location. Coke oven material is still selling at $45.00 to $48.00 f.o.b. steel mill.

Ammonium Nitrate.—Demand in the southeast is practically at a stand still, due to the end of operations by fertilizer manufacturers for this season.

British Fertilizer Consumption Increases

The Monthly Digest of Statistics published by the government of the United Kingdom shows that the use of fertilizers made rapid strides during 1948. While much of the fertilizer used in that country is in the form of individual materials, the use of mixed or compounded fertilizers is increasing. The figures for the different types are as follows:

	1948 Tons	1947 Tons
Nitrogenous fertilizers (tons N).	246,040	224,620
Superphosphate (tons P_2O_5)....	234,800	201,300
Basic slag (tons P_2O_5).....	88,600	74,800
Ground phosphate (tons P_2O_5)..	47,000	45,900
Other phosphate fertilizers (tons P_2O_5).....	44,600	44,800
Potash fertilizers (tons K_2O)...	188,530	148,250
Compound fertilizers.....	1,678,000	1,420,800
Phosphate rock.....	1,005,900	831,500

New Angle on Superphosphate with Manure

For a long time it has been recommended that superphosphate be added to manure to make it a more complete fertilizer. Adding superphosphate tends to decrease the loss of nitrogen in manure, in the form of ammonia gas. Therefore, it was recommended that it be scattered in the stalls and gutters of the barn.

Now, according to an item recently published in *Prairie Farmer*, scientists are changing their minds. According to Ohio research workers, when the ammonia and superphosphate react, the water-soluble phosphoric acid which the plant is able to use is changed to an insoluble form. Such unavailable forms cannot be used as readily by non-legume plants. The more thoroughly the superphosphate is mixed into the manure and the longer the time after mixing, the greater loss of this soluble phosphate.

According to these experimental workers, this cancels any benefit from holding the ammonia. They recommend instead that the superphosphate be scattered on the manure just before it is spread.

Humus Does Not Replace Fertilizer

No one questions the importance of humus in the soil. There is a group, however, who are preaching that the use of commercial fertilizer is positively harmful, and that all our crop production problems can be solved by the use of humus. This is pushing a good idea much too far.

Organic matter is a great soil improver. It holds water, thereby preventing soil erosion. It acts as food for many desirable organisms which live in the soil. It contains plant food which can be used by crops. It improves the physical qualities of soils whether they are too light or too heavy.

However, it is obviously impossible to grow a yearly crop and also to produce on a field the amount of plant material we would like to have added to the soil. It is very well to talk about making compost piles, etc., but the plant material must be grown somewhere, and if you take it from one area to add to another, the first area naturally suffers. To pursue the fallacy of the idea a step farther, it is easy to figure that the country's food supply would be skimpy indeed were it not for the tremendous amounts of plant food added to the soil in the form of commercial fertilizer.

By all means add organic matter to the soil in any profitable way you can. At the same time, don't sell commercial fertilizer short. Use plenty of it and you will not only grow better crops but, through the liberal use of fertilizer, you will have greater crop residues to turn under to make humus.—*American Agriculturist.*

Classified Advertisement

FOR SALE: 5 Used Butler Cars Scoops each with 10 cu. ft. Bucket. Operated by Gas Engine. Address 265 care THE AMERICAN FERTILIZER, Philadelphia 7, Pa.

FERTILIZER PLACEMENT IN ENGLAND

(Continued from page 11)

with work done by the farmer's own machines in the same field. In early experiments on potatoes and other crops, the adjustments to the fertilizer coulters necessary at each plot boundary were difficult and tedious. To complete the experiments in a reasonable time it was necessary to impose restrictions on the experimental layout which were unsatisfactory both to the statistician and to the farmer on whose land the experiment was being laid down. The machines were improved in later years so that adjustments could be made easily and rapidly and any design of experiment could be laid down quickly without any interference with normal cultural operations on the field.

Potatoes

In this country, potatoes are usually planted by ridging up the field, planting in the furrows and splitting the ridges to cover the sets. With this method, fertilizer can be applied in a number of ways. It can be put on the flat land before ridging, it can be broadcast over the ridges before planting or it can be placed in the bottom of the furrow and, if desired, a little soil can be pulled down from the side of the ridge to separate the seed potato from the fertilizer. Broadcasting over the ridges is the way the fertilizer is usually applied but some farmers broadcast before ridging, either because they think it the best way of applying fertilizer or because they have to borrow or hire a distributor.

In these experiments the object was to find the best way of applying fertilizers to ridged land. The following methods were chosen for testing:

A.—Fertilizer was broadcast on the cultivated land before it was ridged for planting.

B.—Fertilizer was broadcast over the ridges before planting.

C.—Fertilizer was placed in a band in the bottom of the furrow.

D. Fertilizer was placed in two bands, each two inches to the side and two inches below the seed.

E.—In four early experiments, fertilizer was placed in a band two inches below the seed.

Each method of applying fertilizer was tested at three rates of dressing, approximately 5, 10 and 15 cwts. per acre of powdered National Compound Fertilizer No 1. (average composition: 7 per cent N, 7 per cent P_2O_5, 10.5 per cent K_2O).

The experiments were marked out before the land was ridged, and applications of broadcast fertilizer were applied to the appropriate plots. After ridging, the two-row fertilizer placement machine built by the N.I.A.E. (National Institute of Agricultural Engineering, Agricultural Engineering Record *1*, p. 171 (1946–7) was used to place fertilizer in bands with, or near the seed. Broadcast fertilizer was applied over the ridges and then potatoes were planted by hand in the furrows and the ridges split back in the usual way.

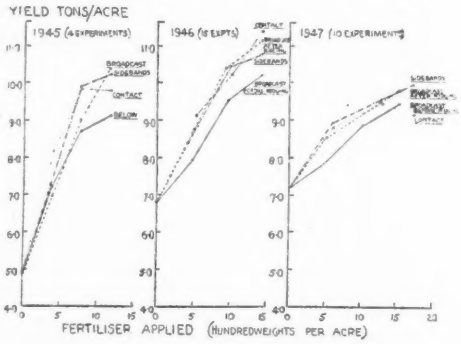


Fig. 1. Variation in Yield of Potatoes with Different Methods of Fertilizer Application

The mean results of all the experiments in each year are illustrated in Fig. 1. In four experiments in 1945, contact placement was superior to broadcasting over the ridges at low and intermediate rates. At the high rate, there was little to choose between the three methods. Placement directly below the seed gave lower yields than the other methods tested; this method was not tested in subsequent years as American experiments confirm that it is an inefficient way of applying fertilizer and it has no practical advantages.

Fifteen experiments in 1946 and ten experiments in 1947 tested the same four methods

of applying fertilizer and gave concordant results. In both years, fertilizer broadcast before ridging gave lower yields than fertilizer applied by the other methods. There was very little difference in the yields of potatoes given in either year by broadcasting over the ridges, contact placement and sideband placement, except that in 1947 fertilizer placed in contact with the seed at the high rate depressed yields due to the very dry weather in the spring.

The results of these experiments were used to provide indices of efficiency of the various methods of fertilizer application taking broadcasting over the ridges before planting as the standard (Table 3).

TABLE 3.

RELATIVE EFFICIENCIES OF FOUR METHODS OF FERTILIZER APPLICATION FOR POTATOES
(Broadcasting after ridging — 100)

	Broadcast		Placed	
	before ridging	after ridging	in contact	as sidebands
1945 (4)	—	100	121	113
1946 (15)	69	100	105	92
1947 (10)	70	100	121	113

On the average of all the experiments the placement methods were not appreciably better than broadcasting over the ridges. There was a very marked and consistent difference between the two broadcasting methods; 10 cwts. of fertilizer broadcast before ridging are required to give the same yield as 7 cwts. broadcast after ridging but before planting.

These experiments on potatoes illustrate the effect of the season in determining the value of a method of placement. One treatment was fertilizer in contact with the seed at approximately 15 cwts. per acre which American experiments and earlier experiments in this country had shown to be dangerous, causing damage to the sprouts of the potato and consequently, a poor plant. The experiments were examined each year to detect any injury caused by fertilizer. In 1945 and 1946, there was no retarding of growth at any centre, but in 1947, at several centres, plots having fertilizer in contact with the seed at the heavy rate showed a serious check throughout the late spring and early summer. 1945 was a fairly normal year with approximately the usual rainfall in May, June and July; 1946 was a wet year but again with normal rainfall in late spring and early summer. The spring and summer of 1947 were abnormally dry and the check to growth caused by fertilizer in contact with the seed must be associated with the long dry period from mid-May to the end of June, which was accompanied by spells of unseasonably hot weather. In America, damage caused by this method of placement is very common and is no doubt due to higher spring temperatures than are experienced in England and to the extensive use of cut seed.

Sugar Beet

Early experiments in this country showed that sugar beet is easily damaged by moderate dressings of fertilizer placed in contact with the seed. Placement beside the seed had been tested in only a few experiments. As there are no commercial row crop drills for seed and fertilizer suitable for experimental work, the National Institute of Agricultural Engineering constructed a special three-row machine (National Institute of Agricultural Engineering, Agricultural Engineering Record *2*, p. 88 [1948]). It places the fertilizer in any position relative to the seed and sows the seed in one operation. The special delivery mechanism described above is used, and a gearbox allows various rates of from 0.5 to 10 cwts. of fertilizer per acre.

In the first year, 1947, granular National Compound Fertilizer No. 2 (9 per cent N, 7.5 per cent P_2O_5, 4.5 per cent K_2O) was applied at 5 and 10 cwts. per acre in a number of ways to give preliminary information on the most suitable method of band placement, viz.:

Broadcast and harrowed into the seedbed
Placed in contact with the seed
Placed in a band 2 inches below the seed and 1 inch away to the side
Placed in a band 2 inches below the seed and 3 inches away to the side.

A summary of the results of the experiments is given in Table 4.

1947 was a very dry year and all methods

TABLE 4.

AVERAGE EFFECT ON PLANT NUMBER AND YIELD OF SUGAR OF 7.5 CWTS. PER ACRE OF NATIONAL COMPOUND FERTILIZER NO. 2 APPLIED TO SUGAR BEET

Eight Experiments in 1947		Yield Sugar Cwts. Per Acre	Plant Number Thous. Per Acre
Unmanured Yield		44.3	23.5
Response to fertilizer			
Broadcast		1.9	0.4
Placed	In contact	−14.2	−9.8
	2 in. below	− 5.3	−5.8
	2 in. below & 1 in. to side	− 2.1	−2.7
	2 in. below & 3 in. to side	0.9	−0.4
13 experiments in 1948			
Unmanured Yield		39.6	24.2
Response to fertilizer			
Broadcast			
	Early	4.4	−0.4
	Late	5.2	0.5
Placed	1 in. to side	5.2	−0.7
	3 in. to side	5.2	−0.3

of placement damaged germination and plant establishment to some extent. Fertilizer either in contact with the seed or directly below the seed damaged germination severely. There was only a small increase in the yield of sugar due to broadcast fertilizer; placed fertilizer generally gave poorer yields than no fertilizer reflecting the reduction in plant establishment.

In the second year, 1948, the experiments tested the same fertilizer placed one inch and three inches to the side of the seed. These methods had proved fairly safe in 1947. Broadcast fertilizer was applied in two ways in 1948 to ensure that the application was not inefficient merely because it was confined to the surface soil where it might be useless during dry weather.

Early: Broadcast on the freshly ploughed land before preparing the seedbed; the cultivations carried out in preparing the seedbed worked this application in to a depth of three or four inches.

Late: Broadcast on the seedbed which was harrowed to work the fertilizer in approximately one or two inches.

The results of the experiments, which are summarised in Table 4, showed, on the average of all the experiments, no serious reductions in plant number caused by placement. Both broadcasting and placement methods gave very similar increases in yield of sugar. Damage to germination was caused by fertilizer placed an inch away from the seed in a few experiments in 1948, and this method of application has been rejected as it is likely to damage the plant establishment if the fertilizers and seed coulters are slightly out of alignment. In both 1947 and 1948, observations on the growing crops showed that fertilizer placed beside the seed gave much better growth than the same quantity of fertilizer broadcast. This superiority of placed over broadcast fertilizer in promoting growth diminished during the late summer and had vanished when the beet were harvested.

Threshed Peas

In 1947 and 1948 experiments on threshed peas tested the methods of fertilizer application which were employed in the sugar beet experiments. The fertilizer used was a special granular material containing 10 per cent P_2O_5 and 20 per cent K_2O and it was applied by each method at 3 and 6 cwts. per acre. The results are summarised in Table 5.

TABLE 5.

AVERAGE EFFECT ON PLANT NUMBER AND YIELD OF PEAS 4.5 CWTS. PER ACRE OF FERTILIZER (Containing 10 % P_2O_5, 20 % K_2O)

3 Experiments in 1947		Yield Cwts. Per Acre	Plant Number Ten Thous. Per Acre
Unmanured Yield		13.2	13.0
Response to fertilizer			
Broadcast		0.3	0.1
Placed	In contact	2.1	−0.8
	2 in. below	3.0	0.6
	2 in. below & 1 in. to side	3.0	1.1
	2 in. below & 3 in. to side	3.0	0.4
5 experiments in 1948			
Unmanured Yield		12.6	14.6
Response to fertilizer			
Broadcast			
	Early	1.6	0.8
	Late	0.8	0.2
Placed			
	1 in. to side of seed	3.2	0.9
	3 in. to side of seed	3.6	1.6

In 1947 fertilizer in contact with the seed damaged germination but the other methods of placement were quite safe. All methods of placing fertilizer near the seed gave higher yields than broadcast fertilizer, which was very inefficient. In 1948 fertilizer in sidebands either one inch or three inches from the seed gave higher yields of peas than broadcast fertilizer. Poor germination was caused at two centres in 1948 by the heavy dressing of fertilizer an inch away from the seed.

Value of Fertilizer Placement

For cereals, there is no doubt that if superphosphate is drilled with the seed only half as much is required to give the same increase in yield as when that fertilizer is broadcast. A similar economy may be made if potash is drilled on certain very potash-deficient soils.

For potatoes planted in ridged land, the best use of fertilizer is made by following the established practice of broadcasting over the ridges before planting. Sideband placement gives very similar results to broadcasting over the ridges and planting machines working on the flat (which of course precludes the conventional broadcasting method) should be equipped with coulters to place a band of fertilizers a little below and to the side of the seed, avoiding placement in contact with the seed owing to the risk of injury in a dry spring.

Sugar beet and mangolds have proved very sensitive to injury to germination by fertilizer placed in contact with the seed and this practice cannot be recommended. The experiments have shown that bands of fertilizer containing much nitrogen and potash should be placed not less than two inches to the side of the seed. Sugar beet showed considerable benefit from placed fertilizer early in the season, but at harvest there was little difference between the yields given by broadcasting and placement. It is likely that fertilizer placed in bands is of maximum value on rapidly growing crops with small root systems; sugar beet is a deeply rooting crop with a long season of growth and, later in the summer, the more mature plant with deep roots may make better use of fertilizer distributed in the cultivated layer.

Swedes have a shallower root system than sugar beet and gave higher yields from placed fertilizer in a few experiments carried out in 1947. The swede crops in that year were poor and so little rain fell after they were sown that much of the broadcast fertilizer probably lay in dry soil and was useless to the crop.

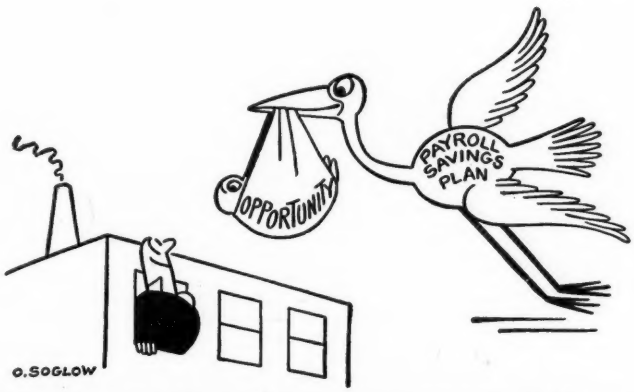
Peas have a relatively small root system and mature much more quickly than root crops so placement should be of particular value. The experiments have been very consistent and have shown that placed fertilizer will produce about 2 cwts. more peas per acre than the same quantity of broadcast fertilizer.

Future Developments

It is interesting to speculate on future trends in placement. We may have to consider splitting applications of fertilizer into two parts, working some deeply into the soil and applying the remainder in a band beside the seed so securing early rapid growth and also providing for the plant when it has a wide and deep root system. American workers have developed deep placement methods and suggest that fertilizer should be placed in the bottom of the furrow when ploughing. Special attachments have been developed to fix on the plough to place a band of fertilizer about 8 inches deep to serve the needs of a crop in drought. The method has been given a special name—"plough sole fertilisation." Maximum fertilizer efficiency might be attained by placing most of the phosphate and potash on the furrow bottom, broadcasting the nitrogen and placing a little phosphate-potash compound beside the seed.

Fruit growers often wish to fertilize established orchards with phosphate and potash. Both nutrients combine with the soil and are not readily washed into the root zone by rain so that surface applications may be of little value while deep cultivations needed to work in the fertilizer will damage the roots. Deep placement machines have been introduced to place a band of fertilizer about 12 inches deep between the rows of either tree fruit or soft fruit. It is claimed that there is an immediate response to the fertilizer applied in this way. (E. F. Palmer and J. R. van Haarlem, Ontario Dept. of Agriculture Bulletin 457[1948])

The application of liquid fertilizers is being developed in America, concentrated fertilizers are dissolved in the water used for irrigation or when planting horticultural crops. Anhy-



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All the help you need to follow this five-step program is available from your State Director, U. S. Treasury Department, Savings Bonds Division. Call him now. Or write the Treasury Department, Washington 25, D. C.

Are You With It?

In the Savings Bonds campaign, May 16-June 30, the Treasury Department asks you to canvass all your employees, with the goal of having at least half of them on the Payroll Savings Plan by June 30th.

The Treasury Department acknowledges with appreciation the publication of this message by

THE AMERICAN FERTILIZER

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

drous liquid ammonia is also applied directly by special machines having coulters working deeply in the soil.

The Suitability of Fertilizers for Placement

Placement may have some influence on fertilizer development as farmers may need new types of fertilizers with special physical forms as well as ordinary fertilizers. The experiments described have shown the superiority of potash combine-drilled for barley on certain soils and of potash drilled beside the seed for peas. It is extremely difficult to drill muriate of potash without special precautions and there is real need of a supply of this fertilizer either in granular form or as a freely-flowing powder. Soluble salts are very prone to damage germination and relatively insoluble forms of nitrogen and potash would be valuable for drilling with the seed at the heavier rates necessary on very poor soils. Such fertilizers would make placement safer for the farmer to use and would simplify the design of drills and reduce corrosion of the mechanism.

The condition of the fertilizer used is of great importance as it affects drillability. Apart from questions of fineness the greatest difficulty arises from the hygroscopic nature of the salts used and from secondary changes and recrystallisation. A powdered fertilizer in satisfactorily free-flowing condition when emtied out of bags can, in a few hours of exposure to a damp atmosphere, take up sufficient water to become a paste quite incapable of flowing through the narrow apertures of commercial distributors. (Mehring and Cumings. U. S. Dept. Agric. Tech. Bull. No. 182). Settling of the fertilizers in the hoppers (which is influenced by the hydroscopicity of the material) increases delivery rates. "Bridging" in the hopper of badly conditioned fertilizer interferes with most types of gravity feed and may stop the flow completely.

In placement fertilizer must flow through tubes, and badly conditioned materials cause many blockages. Further difficulty arises at the point where the fertilizer enters the soil through the coulter. Hygroscopic salts take up moisture from the soil and cling to the metal, ultimately building up sufficiently to block the coulter which cannot be made very large or it causes excessive disturbance of the seedbed and consequently irregular sowing.

These difficulties are at a maximum with powdered fertilizers containing much ammonium and potassium salts and at a minimum with good samples of granular fertilizers. Granular materials are not seriously affected by settling, they do not bridge in the hoppers, they roll easily down feed tubes and cause no trouble in the coulters. They do, however, suffer from the disadvantage that they flow much too easily through certain feed mechanisms.

It is much more difficult than it may seem at first sight to design a machine to dispense fertilizer accurately, since the materials to be used vary from fine powders of approximately 100 mesh to granules perhaps 4 or 5 mms. in diameter. The salts used corrode iron so that an intricate mechanism is quickly destroyed and non-corroding alloys are too expensive.

The star-wheel feed is usually built into combine drills and into American placement drills for row crops. This type of feed is admirable with dry dusty powders which form a large proportion of American output but feed rates of powders are seriously lowered if the fertilizer picks up moisture; granular fertilizer may flow through the mechanism at uncontrolled rates. Other mechanisms used in English drills such as the "plate and flicker" deliver granular fertilizers well and are unsatisfactory with many powders. Again, other mechanisms are used which will not give satisfactory distribution with any type of fertilizer. Satisfactory distribution implies that each row should receive nearly the same amount of fertilizer, that the amounts delivered should be similar on different days with the same setting of the machine, and that distribution along the row should be uniform.

It is of first-rate importance where placement is introduced that the machines used should be reliable and that they should place the correct amount of fertilizer in the correct position. Dressings which are heavier than intended at best waste fertilizer and may be responsible for damage to germination and serious loss of crop. Light dressings will be insufficient to give maximum yields while irregular distribution may give a patchy crop which will condemn the method.

At present one of the factors seriously limiting the extended use of fertilizers is their bad condition; it is no uncommon experience to find the fertilizer attachment on a combine drill or a potato planter not in use merely because the mechanism cannot correctly dispense the kind of fertilizer available on the farm. Manufacturers of both drills and fertilizers should work in collaboration on the design of new placement machines to ensure that a mechanism is devised which will deal satisfactorily with the fertilizers intended for a particular purpose. In the past many inefficient drills have been marketed in an attempt to cope with too wide a variety of fertilizers.

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

AMMONIA—Anhydrous and Liquor
Commercial Solvents Corp., New York City
Lion Oil Co. El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

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Fulton Bag & Cotton Mills, Atlanta, Ga.
Hammond Bag & Paper Co., Welisburg, W. Va.
International Paper Co., Bagpak Div., New York City
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Raymond Bag Co., Middletown, Ohio
St. Regis Paper Co., New York City

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Huber & Company, New York City
McIver & Son, Alex. M., Charleston, S. C

BAG CLOSING MACHINES
St. Regis Paper Co., New York City

BAG PRINTING MACHINES
Schmutz Mfg. Co., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, The, East Point, Ga.
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BONE BLACK
American Agricultural Chemical Co., New York City
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Huber & Company, New York City

BONE PRODUCTS
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Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

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Davidson Commission Co., The, Chicago, Ill.
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Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Baughman Manufacturing Co., Jerseyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARS AND CARTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMICALS
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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill
Lion Oil Company, El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Fittsburgh Agricultural Chemical Co. Pittsburgh, Pa.
Spencer Chemical Co., Kansas City, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Arkansas Rice Growers Corp. Assn., Stuttgart, Ark.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
National Lime & Stone Co., Findlay, Ohio
Quaker Oats Company, Chicago, Ill.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CYANAMID
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

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Sackett & Sons Co., The A. J., Baltimore, Md.

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Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, I
Southern States Phosphate & Fertilizer Co., Savannah, Ga
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
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Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, The, East Point, Ga.
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Stedman's Foundry and Machine Works, Aurora, Ind.

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Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., New York City
Pittsburgh Agricultural Chemical Co. Pittsburgh, Pa.

LEAD BURNERS
Southern Lead Burning Co., Atlanta, Ga.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, The, East Point, Ga.
Baughman Manufacturing Co., Jerseyville, Ill.
Hough Co., The Frank G., Libertyville, Ill.
Hayward Company, The, New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Kent Mill Co., Brooklyn, N. Y.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Baughman Manufacturing Co., Jerseyville, Ill.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

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Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Universal Vibrating Screen Co., Racine, Wis.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

NITRATE OF SODA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS
Lion Oil Company, El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL
American Agriculture Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
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International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid
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Chemical Construction Corp., New York City
Monsanto Chemical Co., St. Louis, Mo.
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Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BUYERS' GUIDE

SCALES—Including Automatic Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
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Sturtevant Mill Company, Boston, Mass.
Universal Vibrating Screen Co., Racine, Wis.

SEPARATORS—Air
Kent Mill Co., Brooklyn, N. Y.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Co., Boston, Mass.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.

SULPHURIC ACID
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tenne Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, G.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

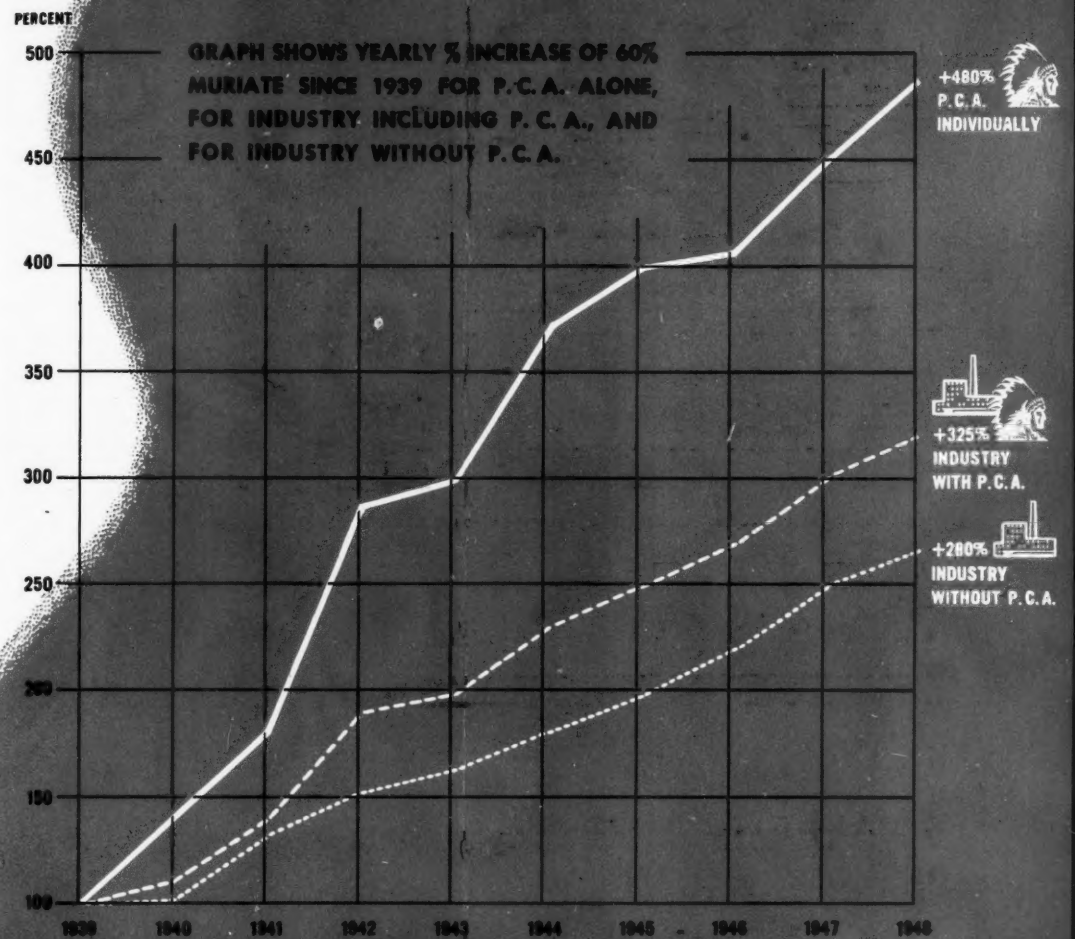
TAGS
Keener Mfg. Co., Lancaster, Pa.

TANKAGE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers

We've been doing some figuring...



1948 was a record year for domestic Potash. Using '39 as a base, the industry—not including P.C.A.—showed an increase of 280% in 60% Muriate. P.C.A. production lifts the industry increase to 325%. ***P.C.A. alone shows a High Grade Muriate increase for the same period of 480%.***

95% of all P.C.A.'s '48 deliveries were in the form of 60% Muriate. Our new $4,000,000 production and refining facilities now are operating. Our deliveries for '49-'50 will break all previous records. In fact, P.C.A.'s production capacity for 60% Muriate this year will exceed by some 150,000 tons the entire potash consumption — all grades — of the nation ten years ago.

These figures are graphic evidence of the leadership P.C.A. has won . . . leadership in volume, in economy to you and to agriculture.

P.C.A.
the SALT of the EARTH
RED MURIATE

Potash Company of America
Carlsbad, New Mexico

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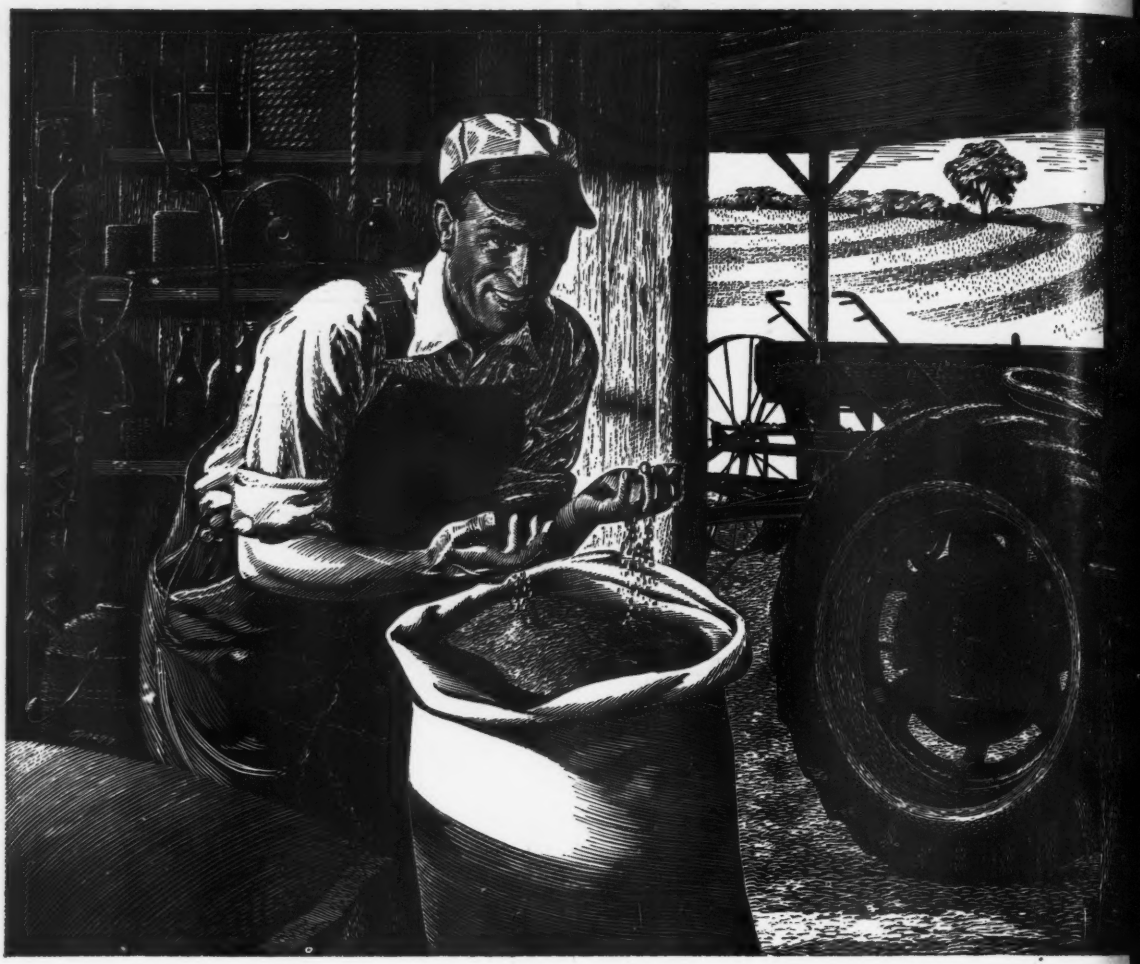
SOUTHERN SALES OFFICE . . Candler Building, Atlanta, Ga.



Why Farm Mechanization Increases Need for Magnesium in Mixed Fertilizers

Sul-Po-Mag

Water-Soluble
Double Sulfate of Potash-Magnesia

Magnesium deficiencies in the soil, appearing in unexpected places, may in some cases be the result of farm mechanization.

The reduction in the number of draft animals on the farm, in some fertilizer-using states, has resulted in a decreasing tonnage of magnesia returned to the soil in manure. Increasing evidence of magnesium deficiency in the soil in many parts of the country, *whatever the reason may be*, is stimulating the demand for fertilizers containing soluble magnesium.

Many farmers are finding that the most practical and economical way to get magnesium is in combination with potash. *Sul-Po-Mag*, mined and refined exclusively by International at Carlsbad, New Mexico, supplies both potash and magnesium in a natural combination. Both the potash and magnesium are in water-soluble form and are quickly available to crops.

By using *Sul-Po-Mag* in your fertilizers, you can help farmers to overcome magnesium deficiencies in their soils and increase the quality and yields of their crops.

SUL-PO-MAG (Water Soluble Double Sulfate of Potash-Magnesia) • MURIATE OF POTASH • SULFATE OF POTASH

SUL-PO-MAG TRADEMARK REG. U. S. PAT. OFF.

Potash Division • International Minerals & Chemical Corporation

International Minerals & Chemicals

General Offices: 20 North Wacker Drive, Chicago